

Amendments to the Specification:

Please replace the paragraph beginning at page 6, line 6 with the following amended paragraph:

In the passage of photons through matter, a photon interacts with atoms or nuclei in an energy-dependent way. Specifically, high atomic number (Z) materials tend to absorb higher energy photons, and low Z materials tend to absorb lower energy photons. The invention includes a method and/or apparatus for measuring the attenuation of a photon beam flux, therefore yielding a measure of the density and distribution of the interrogated material. The invention may be used to identify and distinguish high and low density materials concealed within a vessel, including weapons-grade materials such as, for example, uranium, plutonium, or radiation dispersion devices (known as "dirty bombs"). Further, the invention can include using a detector with a natural uranium target to measure the fission fragments induced from photons. In one embodiment, the detector has a high degree of photon-energy selectivity in the range of 10.0 to 20.0 MeV. In another embodiment, the invention includes a photon beam flux monitor including a detector for resolving photon energies up to about 6 MeV and another detector for resolving ~~fission-fragment~~ photon energies above about 6 MeV. In yet another embodiment, the invention includes using three detectors, each detector being sensitive to a different range of energies. These energy ranges may overlap.